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but probably only in wet weather. In this species a number of stipes may develop from the same comb.

If a piece of fresh comb be removed from the nest and placed under a bell jar the spheres will decay if the insects have been removed but both spheres and external hyphæ will be eaten if the termites remain. In the course of two or three days after the surface of the comb has been freed from these, small groups of erect hyphæ, indistinguishable from those which give rise to the agaric, but apparently derived from the interior of the comb-substance, appear and grow rapidly into tall thin structures resembling the conidial forms of Xylaria. Petch has carried on a large series of cultural experiments with this form and concludes that it is probably *X. nigripes.* The termites eat this too as it develops. After continued rain *X. nigripes* grows from deserted nests.

Besides these forms, Mucor, Thamnidium, Cephalosporium, and Peziza sometimes grow on combs removed from the nests. Since none of these are found in the nests, though some of them are capable of growing underground, it seems probable that the insects "weed out" undesirable fungi as they develop.

Although it is known that the termites will eat the fungi it is not definitely proved that they form the food of the insects. The two species studied prefer fungi, or wood which has been attacked by fungi. Whether a difference in food is a factor in the differentiation of the termites into workers, soldiers and sexed insects is not decided.

The author observes that the mycelium of *Entoloma microcarpum* is composed of spheres of swollen cells which in detail resemble the termite spheres but are not so highly developed. He thinks that the spheres of the termite nests and the "Kohlrabihäufchen" of the leaf-cutting ants investigated by Möller are parts of a normal mycelium and that their form has been little, if at all, modified by the insects.

J. ARTHUR HARRIS.

The Longleaf Pine.— Schwarz's *The Longleaf Pine* [1] is an attractive little volume, describing in a popular style the silvics of *Pinus palustris,* the valuable hard pine of the Southern States. The subject matter is considered under nine main headings which cover the character of the virgin forests of this tree and their natural rotation, the tolerance of the species, its relation to injuries by fire, insects, cattle, and swine, its rate of growth, and its technical forest management.

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[1] Schwarz, G. Frederick. The Longleaf Pine in Virgin Forest, a Silvical Study. New York, John Wiley & Sons, 1907. 12mo, xii+135 pp., illustr.

The longleaf pine is characteristic of the so called Southern Pine Forest, and occurs principally in a belt some 125 miles broad, from Virginia south and west along the coast to within a short distance of the Mississippi River, and in southeastern Texas. The chief type is that of a pure forest. Owing to various destructive causes, these forests are largely in groups of different ages. A second, mixed type is found farther inland, and is largely determined by differences in the composition of the soil. Here the longleaf pines occur on the hilltops while farther down, on the richer or damper slopes are the oaks, hickories, and other deciduous species, with shortleaf and loblolly pines.

The natural course of evolution of the longleaf pine forest and its method of reproduction are briefly sketched. The species is intolerant of shade and requires direct overhead light, since the dense terminal clusters of leaves shade the buds from side light.

The chief danger to which the southern forests are subject, is doubtless fire, hence this is treated at considerable length. The fires in longleaf pine forests are exclusively surface fires, which not only destroy the young seedlings in the grass, but injure the butts of the older trees, causing often considerable damage. The frequency of fires, set either accidentally or purposely for burning over grass lands, makes imperative the employment of rangers and the construction of fire lanes about commercial forests. As a rule, seedlings of one or two years' growth are destroyed by surface fires, but older plants usually escape total destruction by virtue of their thick bark and the dense head of long needles that not only protect the terminal bud but form a miniature fire screen by hanging down about the short stem to the ground. Frequent fires will, however, kill even these older seedlings, to say nothing of their destructive action on the humus.

The future silvicultural treatment of these forests is considered in Chapter 8. The forest must be perpetuated as well as exploited. Cutting to a diameter limit of 16 inches has been recommended. In some cases, a method of clear cutting with reserve trees left for seeding the cut over area will probably be found good. The aim of future management will also be partly to bring these forests into a more uniform condition instead of their present great irregularity.

Although more extended tables as to rates of growth and volumes might have been added, this little book will no doubt serve its purpose in helping the lumberman and the general reader to a better understanding of the proper study and treatment of our southern pine forests. The volume is handsomely printed and fully illustrated.

G. M. ALLEN.